collegiate undergraduates of Oxford; to all undergraduates of Oxford; and any students who are not members of either University. The candidates may select their own subjects for examination. Besides these there are three other exhibitions perfectly open, which are distributed annually among the most deserving students of the College.

Clare College.—One of the value of 50*l.* per annum. The examination (in chemistry, chemical physics, comparative anatomy, physiology, and geology) will be on March 30th, and will be open to students intending to begin residence in October. The candidates must show such acquaintance with classics and mathematics as will qualify them to pass the previous examination.

St. Peter's College.—One of the value of 60*l.* per annum. The examination (in chemistry, botany, comparative anatomy and physiology) will be in June, and will be open to all students who are not members of the University, or who have not commenced residence in the University.

Downing College.—One or more, according to the merits of the candidates, of the value of 40*l.* per annum. The examination (in chemistry, comparative anatomy, and physiology) will be in March, and will be open to all students not members of the University, as well as to all undergraduates in their first term.

Sidney College.—Two of the value of 40*l.* per annum. The examination (in heat, electricity, chemistry, geology, physiology, botany) will be in October, and will be open to all students who may enter on the college boards before October 1st.

Although several subjects for examination are in each instance given, this is rather to afford the option of one or more to the candidates than to induce them to present a superficial knowledge of several. Indeed, it is expressly stated by some of the colleges that good clear knowledge of one or two subjects will be more esteemed than a general knowledge of several.

Candidates, especially those who are not members of the University, will in most instances be required to show a fair knowledge of classics and mathematics; such, for example, as would enable them to pass their previous examination.

There is no restriction on the ground of religious denomination in the case of these or any of the scholarships or exhibitions in the university or the college.

Further necessary information may be obtained from the tutors of the respective colleges.

It may be added that Trinity College will give a fellowship for natural science once, at least, in three years, and that most of the colleges are understood to be willing to award fellowships for merit in natural science equivalent to that for which they are in the habit of giving them for classics and mathematics.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his Correspondents.*]

Mental Progress of Animals

I HAVE failed to meet with a satisfactory treatment of this subject either in works of mental philosophy or natural history. Sir John Lubbock, in "Prehistoric Times," refers to the likelihood of the sagacity of man and the wariness of animals proceeding *pari passu;* but he does not develop the idea or aid it by illustration, and I find that the tradition still widely prevails that the instinct and intelligence of animals is a thing fixed and unchangeable; and that the mammals which roamed over the world during the earlier and middle tertiary epoch must be credited with the same amount of sagacity as their representatives of the present day. Such statements are assumptions opposed to the current of any facts we possess on the subject. Much of what has been termed *cunning* in animals will be found to have been very much sharpened and made evident in quadrupeds and birds, owing to the new necessities imposed upon them by man the tamer or man the destroyer.

For it is under one of these two characters that man approaches animals, affecting them in the most complex and vivid manner. No bird or quadruped so high in the mental scale as the dog, horse, rat, rook, or sparrow, has been found in the lonely oceanic isles or in any region free, or all but free, from human influence; not because in these quarters such animals could not exist, but rather it would seem because the aboriginal fauna had no opportunity for the improvement of its wits by coming in contact with an enemy or friend so complex, dreadful, and ingenious as a human being.

One of the first impulses communicated to the wits of the wild animals is that derived from the sense of new wants. Now, this is what man supplies by his cultivated fruits and cereals. A feast is spread before quadrupeds and birds more generous than that of nature. But this banquet is guarded, and often becomes a baited trap in which the simple thief is caught; but a very slight increment of sagacity is sometimes enough to turn the scale, and this quickness of wit, especially in the first ages of society, as among existing savages, would be slowly met by improvement of trap. Necessity—on either side the mother of invention—would at last permit only wary vigilant enemies, since these alone could succeed, to hang round the skirts of kraals and wigwams, approach in twilight the crops near stockaded villages, prowl about places of interment, lodge in sewers, enter cellars; and, keenly alive to every sign of danger, multiply in spite of poison, trap, and gun, and in defiance of trained animals of their own and allied species, and that division of labour which gives us special hunters.

The fear of man is a slowly acquired instinct. Mr. Darwin, in his account of his travels, gives some interesting instances of the fearlessness of birds little exposed to man in South America. The crew of Byron's vessel were astonished at the manner in which the wolf-like dog of the Falkland Islands approached them merely out of curiosity. Compare these traits with the admirably organised expeditions for plunder of baboons, elephants, &c., and the rude customs acted upon for self-preservation of the half-wild dogs of the Peninsula and the East, wherein the care of the weak and young, the usefulness of sentries, the value of signals, the difference between sham and real danger, and the advantage of confusing traces of retreat, seem all to be known, and it will be pretty evident that man the thinker has to a considerable extent reacted on animals wild and domestic. Even in my own quarter it is the steady belief of the shepherds that the common sheep-dog has progressed in intelligence and docility within the last fifty years by careful selection. "Where the dog is not valued for intelligence, as in some Eastern countries, it is a much more stupid animal than with us."

Now were we in vision to behold that wonderful Miocene age, when the great mammals roamed over Europe unpeopled as yet by man, I am convinced that both they and the birds of the period would be less interesting and more monotonous in their habits than those which people Europe at the present day, and have for ages been engaged in a struggle for existence with a being so much superior to themselves; and that in prehuman times the horn, hoof, tooth, and coat of mail, to a far greater extent than now, ensured victories which other and more subtle agencies are now necessary to secure on the part of those animals nearest to man in organisation and habits.

Nov. 21 J. S.

The Suez Canal

I NOTICE in your number of 4th inst. an article relating to the Suez Canal (by Mr. Login, C.E., late of the Ganges Canal), and shall be glad if you will allow me to make a few observations with reference to it.

In making his suggestions, Mr. Login appears to have overlooked the fact that there is already a sweet-water canal connecting the Nile with the centre of the isthmus, and passing through the Wadi Toumilat, which it has watered and fertilised; and, further, that it is proposed, when the actual work of excavation in the maritime canal is completed, to commence irrigating operations on a large scale by means of this canal.

As to diverting the Nile, or one of its mouths, and thereby forming the great maritime canal, that is quite another affair. In the first place, if I remember rightly, the water in the present sweet-water canal, where it meets the great canal, is some twelve feet above the level of the latter—in other words, above the level of the sea. Does Mr. Login think, then, that to carry the water at this level for 50 or 60 miles across and above the shallow lakes of Menzaleh and Ballah and the plain of Suez

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would have required *less* excavation than the actual scheme? In the second place, as Mr. Login says, there would be locks at either end of the canal, which would be not only costly, but most inconvenient for ships in their passage. In the third place I doubt very much whether the whole stream of the eastern branch of the Nile would suffice to keep the canal and the great Bitter Lakes full. Some time ago, indeed, it was disputed whether the Mediterranean and the Red Sea *together*, pouring into the Bitter Lakes, would raise them to the level of the sea, owing to the influences of absorption and evaporation. The facts, however, proved to the contrary.

Still, Mr. Login is much more ambitious. With a *single* stream (that is to say, taking the eastern branch of the Nile at Damietta), less in volume than the present maritime canal, he proposes not only filling the Bitter Lakes to the level of the sea, but raising them to a level of at least twelve feet beyond it (thereby nearly doubling their present volume). Lastly, if the canal and Bitter Lakes could be filled sufficiently by the Nile spring the dry season, it would be overflowing during the floods, and if it could be filled only in the season of the floods, in the dry season it would be nearly empty.

As to the question of breakwaters at the Mediterranean end, Mr. Login rightly says that the annual deposit along the coast is hardly perceptible. I cannot see, therefore, what improvement the breakwaters he suggests would be upon the present ones, seeing that the easterly current *now* passes the extremity of the west pier with a speed of two or three miles an hour. He therefore not only proposes sending a current of at least five miles an hour for a considerable distance up the canal (as his plan infallibly must)—rendering it in strong prevailing winds almost impossible to get out from between his breakwaters—but also sacrificing a splendid harbour of 550 acres in extent.

I quite agree with Mr. Login in thinking that the Suez Canal will not only outlive all abuse, but become one of the greatest blessings to the civilised world.

Birkenhead, Nov. 11 EDW. RAE

The Poles of Mars

PERMIT me through your columns to inquire whether any experiments have been made, by polarisation, to test the statement that the light from the brilliant spots round the poles of Mars is *reflected?*

If nothing has yet been done, will some correspondent decide the point? G. W.

Nov. 25

Lectures to Ladies

IN the fourth number of NATURE there is a letter signed "M." on this subject, in which it is asserted that nearly all the women who most wish to attend these lectures, and who would most benefit by doing so, "are practically shut out from those at South Kensington and at University College, because none of the lectures are given in the evening." Your correspondent gives South Kensington credit for saying something about "persons engaged in tuition," but she adds that it is a mere mockery, as this very fact prevents their getting out in the daytime.

I can confidently say that the Committee for the Higher Education of Women most earnestly desires to interest and benefit those who are teaching others, and who feel the necessity of a better education for themselves; but I believe that the wider and more general object of the whole movement (of which this small committee for South Kensington and Chelsea forms a struggling and isolated element) is, not *so much* to improve those who are already engaged in teaching, as to elevate the tone of education amongst girls who will eventually be teachers, whether as governesses or as mothers.

This I think is enough reason for giving the lectures in the daytime, for it would be difficult for girls to come out alone to classes in the evening. Of course it is hoped that in time a regular system may be established for the training of teachers and students at once, but meanwhile we can but trust that even these weak forces, if they are rightly directed, may have some good effect, if it is only in awakening an interest in these subjects amongst those who can help.

It is very difficult, in London especially, to get at the class of students which we most wish to benefit. I think the fact is that, in London at least, schoolmistresses and governesses are, with a few exceptions, inclined to be narrow and conservative on the subject of educational improvements. If they would only come forward and interest themselves in the scheme their co-operation would be most valuable.

I hope that your correspondent "M." and others who feel as she does, may see this letter and will understand how difficult it is at the outset to satisfy so many conflicting requirements at once.

The course of lectures on Greek History and Literature which Mr. W. R. Kennedy is now giving on Saturdays at the South Kensington Museum is very thinly attended, which is exceedingly discouraging, especially as particular pains have been taken to make these lectures strictly educational, by means of questions set to be worked at by the students at home.

Brompton, Nov. 30 M. A. B.

The American Eclipse

DR. MORTON, Professor of Chemistry in the University of Pennsylvania, has kindly forwarded me photographs of the phenomena of totality. By combining in the stereoscope pairs of these, separated by intervals of about half-a-minute of time, the black globe of the moon appears projected far in front of the luminous prominences and the corona, which are, therefore, clearly seen to belong to the sun. Glass transparencies from negatives specially selected for this purpose, and appropriately mounted, would show these phenomena in a very striking manner.

WILLIAM CROOKES

NOTES

TO-NIGHT the physicists take their turn at the Royal Society, and the physical constitution of the sun will form one of the subjects dealt with.

WE believe that the communication to be read at the Royal Geographical Society on Monday will be one of great interest.

A PERIODICAL, after the model of the popular *Annales des Sciences Naturelles*, will be commenced in Paris at the beginning of the year. It is to be named the *Annales des Sciences Geologiques.* We are promised an important and fully illustrated memoir on the Geology of Palestine, by M. Lartet. The editors of the new journal will be M. Alphonse Milne-Edwards for the Palæontological, and M. Hebert for the Geological departments.

THE Swedish Academy of Sciences has just issued, under the title "Lefnadsteckningar öfver Kongl. Svenska Vetenshaps Akademicus efter År 1854 aflidna Ledamöter," the first number of a series of biographical notices of those of its members who have died since the year 1854. In the absence of the preface, which is deferred until the publication of the second number, we are unable to say whether all the members of the Academy are thought worthy a special biography, or only its most distinguished members. However this may be, we fear that very few of the twenty men, whose lives are recorded in this first number, are known to fame beyond the limits of their native land, notwithstanding that most of them have left behind them honourable records of scientific labour. We do not say all of them, because we notice an archbishop and a bishop, whose claims to admission to the Academy must, judging from their published works, have rested upon their social position or general attainments rather than upon their scientific labours.

WE have been favoured by Professor Newton, of Yale College, with the following notes as to the November star-shower:—"We were unfortunate here this year in observations upon the November meteors. Both nights, the 13th-14th, and 14th-15th, having been overcast. Through breaks in the clouds we saw a few stragglers, some of which were true November meteors, radiating from Leo, and leaving for an instant the soft trail peculiar to those bodies. But the number of meteors during the hour between three and four a.m. of Monday morning was probably not more than double or treble the usual number for any morning. The small part of the sky visible prevented any reliable estimate of numbers. Similar weather has rendered observation impossible at every station from which I have heard."

FROM a preliminary report made to the Association Scientifique de France, by M. C. Wolf, of the Imperial Observatory of Paris,

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